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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/656,696 | 09/04/2003 | Woong-Kyu Min | YOM-0054 | 8570 |

7590
Cantor Colburn LLP
55 Griffin Road South
Bloomfield, CT 06002

03/27/2007

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| EXAMINER |
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MOON, SEOKYUN

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| ART UNIT | PAPER NUMBER |
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2629

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 03/27/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|--------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/656,696 | Applicant(s) MIN ET AL. | |
| | Examiner Seokyun Moon | Art Unit 2629 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 13-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☒ Claim(s) 3-5 and 13-17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The amendments to the drawings were received on 03/08/2007. These drawings are acceptable and will be entered for further examination purpose.

Response to Arguments

2. The applicants' arguments filed on 03/08/2007, with respect to the rejection(s) of claim(s) 1 and 2 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejections are made.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claim 1** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wei et al. (US 2003/0137485, herein after "Wei") in view of Funamoto et al. (US 2003/0142118, herein after "Funamoto").

Wei [fig. 3] teaches an inverter ("*light source modulator 42*") for a liquid crystal display [abstract lines 1-2], the inverter comprising:

an inverter controller ("*pulse width modulation controller 58*") [fig. 3] generating a lamp driving signal ("*PWM signal 59*") having on-time and off-time by pulse width modulating a

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dimming signal ("*feedback signal 56*") [par. (0023) lines 12-18 and fig. 3, wherein the feedback signal 56 is inputted into the pulse width modulation controller 58, and then a modulated signal, PWM signal 59 corresponding to the pulse width of the feedback signal is outputted from the controller];

a power switching element ("*Q4*") [fig. 3] selectively transmitting a DC voltage ("*V_M*") in response to a signal ("*PWM signal 59*") from the inverter controller ("*light source modulator 42*") [par. (0023) lines 18-24]; and

a voltage booster ("*transformer T2*") for driving a lamp ("*back light source 38*") in response to a signal from the switching element [par. (0023) lines 22-24].

Wei does not expressly disclose the inverter controller to generate a carrier signal for pulse width modulation and to modulate the dimming signal based on the carrier signal.

However, examiner takes official notice that it is well known in the art to use a carrier signal such as a sawtooth waveform or a triangle wave form in order to modulate a signal, in pulse width modulation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inverter controller of the display of Wei to generate a carrier signal internally and to modulate the dimming signal based on the carrier signal, in order to allow the controller of the display of Wei to adjust the intervals between modulated pulses by controlling the carrier signal, and thus to optimize signal transmission.

Wei as modified above does not teach that the on-time of the lamp driving signal is controlled in response to at least one of a vertical synchronization signal and a vertical synchronization start signal.

However, Funamoto teaches an idea of synchronizing a lamp driving signal with a vertical synchronization signal, in a liquid crystal display.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display of Wei as modified above to synchronize on-time of the lamp driving signal with a vertical synchronization signal, as taught by Funamoto, in order to output appropriate brightness level according to the image to be displayed.

5. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wei and Funamoto as applied to claim 1 above, and further in view of Lee et al. (US 2002/0057247, herein after "Lee").

Wei as modified by Funamoto inherently teaches a means for providing the vertical synchronization signal since the display of Wei as modified by Funamoto discloses that a vertical synchronization signal is fed to the inverter controller [Funamoto: fig. 3].

Wei [fig. 3] teaches that the dimming signal ("*feedback signal 56*") being provided from an external device ("*feedback circuit 36*").

Wei does not disclose a vertical synchronization start signal being provided by the signal controller.

However, Lee [fig. 3] discloses a timing controller ("*timing controller 100*") providing a vertical synchronization start signal [par. (0121)].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display of Wei as modified by Funamoto to provide a vertical synchronization signal, as taught by Lee, in order to allow the display of Wei as modified by Funamoto to adjust and to optimize the timings of driving gate scanning lines and thus to prevent flickers or image degradation of the display.

Allowable Subject Matter

6. Claims 3, 4, 5, 13, 14, 15, 16, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seokyun Moon whose telephone number is (571) 272-5552. The examiner can normally be reached on Mon - Fri (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (572) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

03/23/2007

- s.m.


SUMATI LEFKOWITZ
SUPERVISORY PATENT EXAMINER